

Comments/Remarks

Claims 1 through 24 remain pending in the present application. Claims 1, 13, 23 and 24 have been amended. Claim 2 has been canceled.

In the Office Action, the drawings were objected under 37 CFR 1.83(a) as not showing figures necessary to shown every feature specified in the amended claims. The drawings have been corrected and the Replacement Sheets and New Sheet have been filed herewith. No new matter has been added.

In the Office Action, claims 9, 10, 11, 19, 20 and 21 were rejected under 35 U.S.C. 112(1) as lacking enablement. Applicants respectfully disagree. The relevant disclosure is found in paragraphs [0023] and [0024]. The features concerning the cameras are known to one of skill in the art. Further, the subject matter on Page 8 is disclosed in the claims and is incorporated into the body of the specification. This subject matter is also relevant enablement of the highlighted claims. This addition language is not new subject matter is already disclosed in the claimed invention. Reconsideration and withdrawal of the 35 U.S.C. 112(1) rejection is respectfully requested.

In the Office Action, claims 1 through 24 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,249,954 to Allen et al. (hereinafter "the Allen et al. patent") and U.S. Patent No. to Goff et al. (hereinafter "the Goff et al. patent").

Independent Claim 1 is directed to a method of viewing a flame produced by a burner in a pyrolysis section of a petroleum cracker furnace, wherein the fuel burnt by the burner is natural gas. The method has the step of viewing the flame through an interference filter adapted to pass light of the wavelength of sodium only.

Independent claim 13 is directed to an apparatus comprising a furnace, a burner for burning natural gas in the pyrolysis section of a petroleum cracker furnace and an apparatus for viewing the flame produced by the burner, the apparatus for viewing the flame comprising an interference filter adapted to pass light of the wavelength of sodium only.

Claim 23 is directed to a pyrolysis section of a petroleum cracker furnace comprising a burner for burning natural gas housed within the walls thereof and a window provided in a wall of the pyrolysis section of a petroleum cracker furnace, wherein an interference filter adapted to pass light of the wavelength of sodium only is provided in or on the window.

Independent claim 24 is directed to glasses for viewing a flame produced in a pyrolysis section of a petroleum cracker comprising an interference filter provided in each lens thereof, wherein the interference filter is adapted to pass light of the wavelength of sodium only.

The Allen patent is directed to a combustion control system for optically monitoring a flame produced by burning, among other combustibles, natural gas, in a combustion facility. The system also provides a neural net in a closed loop control system arranged to regulate the fuel-air ratio of the flame based on a monitored flame image such that the combustion efficiency is maintained at an optimal operational level. Allen also teaches the use of interference filters to monitor such a flame within the bandpass of emission of interesting species within the flames, such as CO (2.3 to 2.4 μm) and CO₂ (4.2 to 4.3 μm).

The Goff patent relates to a fiber optics based monitoring system for monitoring the combustion of coal by using an interference (dichroic) filter centered around the sodium D line to cancel out the background blackbody radiation thus allowing the flame to be viewed. However, Goff does not suggest applying this technique to the monitoring of natural gas combustion.

The Allen patent does not suggest or disclose a method of viewing a flame produced by a burner in a pyrolysis section of a petroleum cracker or that the flame is viewed through an interference filter adapted to pass light of the wavelength of sodium only.

The Goff et al. patent does not correct these deficiencies. In fact, neither the Allen patent nor the Goff patent suggest or disclose pyrolysis section of petroleum crackers or petroleum cracking furnaces in general as claimed in amended claim 1.

Therefore it would not be obvious to one of ordinary skill in the art to monitor the natural gas burner flames in the pyrolysis section of a petroleum cracker in the sodium D line as the prior art does not relate to petroleum cracking, but very different technical fields. Further, neither patent teaches monitoring natural gas flames at this wavelength.

There is no suggestion in the prior art that burning natural gas will produce emission in the sodium D line. Indeed, it is the unexpected discovery of traces of sodium in natural gas that has lead the inventors to develop the claimed method of monitoring natural gas flames in the pyrolysis section of a petroleum cracker in the sodium D line. As the prior art does not teach that such an emission line will be present when monitoring the burning of natural gas in the pyrolysis section of a petroleum cracker, it would not be obvious for one of ordinary skill in the art to view the flame at this wavelength to cancel out the blackbody radiation.

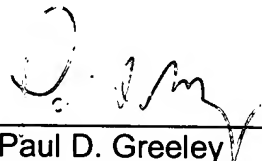
In the Office Action, Official notice was taken to claims 2, through 5, 7, 8, and 14 through 18 as being obvious and well known. Applicants respectfully disagree. The Action took official notice to claims 10 to 14 and 18. Official notice should be supported by documentary evidence and capable of instant and unquestionable demonstration as being well known. Thus, the Action should be

able to produce references that show the claimed subject matter as well-known and unobvious.

In the Office Action, claims 9, 11, 19 and 21 were rejected as being merely matters of design choice that absent any new or unexpected results produced therefrom over the prior art of record. Claims 9, 11, 19 and 21 are directed to critical aspects of the invention. Therefore, if the claimed subject matter were matters of design choice, such subject matter should be easily found in the prior art.

Accordingly, reconsideration and allowance of the claimed invention is respectfully requested.

Respectfully submitted,



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APPENDIX

In the Drawings:

In The Drawings a new figure, Fig. 3 has been added. No new matter has been added. The corrected sheets are in compliance with 37 CFR 1.83(a) and 37 CFR 1.121(d). The are attached hereto in the Appendix.